



# NASA Procedural Requirements

**COMPLIANCE IS MANDATORY**

**NPR 8705.3**

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2003

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## Subject: Safety and Mission Assurance (SMA) Requirements for Experimental Aerospace Vehicles (EAV) w/ Change 1 (3/30/04)

Responsible Office: Office of Safety and Mission Assurance

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## CHAPTER 5. Assess SMA Flight Readiness

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### 5.1 EAV SMA Flight Assessment

5.1.1 When there is a program certification of readiness for flight, the Associate Administrator for Safety and Mission Assurance (or designee) shall be a signatory ([Requirement 21103](#)). Prior to concurrence on the certification of readiness for flight, the Associate Administrator for Safety and Mission Assurance should review and verify the status of any open items identified in the assessment as they pertain to the readiness for flight.

5.1.2 Following the SMA PAR, the EAV program/project manager shall develop the plan and schedule leading to final SMA Flight Assessment prior to flight ([Requirement 21104](#)). (In the event that there are no open items requiring closure, the Associate Administrator for Safety and Mission Assurance may adopt the assessment letter defined in paragraph 4.5.3 as the final SMA Flight Assessment.)

5.1.3 For any reviews being held after the SMA PAR, the certifying/performing Center Director and the EAV program/project manager shall ensure that the Associate Administrator for Safety and Mission Assurance (or designee) is invited to participate in the final review(s) ([Requirement 21039](#)). Those review(s) shall include any items that may affect the SMA flight certification or closure of open items identified in the SMA Flight Assessment ([Requirement 30923](#)). Upon closure, the Associate Administrator for Safety and Mission Assurance shall indicate that the activities in paragraph 5.3 determined to be appropriate have been successfully completed and that all identified mission safety risks have been demonstrated by the program/project to be controlled to an acceptable level ([Requirement 30924](#)). The signature indicates OSMA concurrence of flight readiness.

5.1.4 At approximately 2 weeks prior to the start of the mission, the Associate Administrator for Safety and Mission Assurance and the Enterprise Associate Administrator (or designee(s)) will conduct a tag-up telecon or meeting with the EAV program/project manager, the certifying/performing Center Director(s), and Center SMA Directors(s), or designees as approved by the Associate Administrator for Safety and Mission Assurance, to reaffirm concurrence that the mission can proceed.

### 5.2 Third-Party Indemnification Requests

Third-party indemnification requests shall be processed as follows:

- a. A developer seeking indemnification will make its request in accordance with the procurement contract or other governing agreement, as applicable ([Requirement 21040](#)).
- b. A contractor or other party who desires indemnification against third-party claims shall make the request to the contracting officer as set forth in the contract or agreement ([Requirement 31527](#)).
- c. The contracting officer or other NASA official receiving the request shall forward the request and any contract- or agreement-required proof of insurance to the program/project manager ([Requirement 31528](#)).
- d. The program/project manager shall forward the request, the proof of insurance, copies of the final assessment

letter, and any "maximum probable loss" calculation to the Enterprise Associate Administrator ([Requirement 31529](#)).

e. The Enterprise Associate Administrator sends third-party indemnification requests, with the recommendations from the Associate Administrator for Safety and Mission Assurance, the Chief Financial Officer, and the NASA General Counsel, to the NASA Administrator for approval ([Requirement 31530](#)).

### 5.3 Basic Set of EAV Program/Project Elements for EAV Program/Project SMA Flight Assessments

Table 2 contains the listing of the SMA programmatic elements that are nominally applicable to EAV program/project SMA flight assessments. SMA management will use the flight assessment elements listed in Table 2 in acquiring the knowledge and understanding needed to ensure an EAV is ready for flight from the SMA perspective. Table 2 is not intended to be all-inclusive, but is representative of the key element areas and should be used at milestone reviews to assess the level of SMA process maturity.

The Center SMA organizations are responsible for evaluating the quality and thoroughness of the requirement implementation/products ([Requirement 21041](#)). The OSMA (or designee) representatives evaluate the what, the process, and who verifies the requirement implementation. Additionally, the OSMA representatives spot-check requirement products for quality and thoroughness. The Reference Documentation column in Table 2 provides the reference to the base requirements. Additionally, the quality record to be stored after each use of Table 2 shall describe how each element was verified (direct or indirect) and who did the verification ([Requirement 31531](#)).

**Table 2: SMA Flight Assessment Elements**

Endorsement	Element	Reference Documentation	Notes
1.	Program management documentation required per NPR 7120.5 has been completed and the SMA paragraphs are current. NPR 7120.5 SMA-related documentation includes: Program Commitment Agreement (PCA), Program Plan, Project Plan, Configuration Management Plan, Risk Management Plan, System Safety Plan, NASA SMA Plan, Prime Contractor SMA Plan, and System Engineering Management Plan.	NPR 7120.5, Paragraphs 4.3, 4.6, and Appendix E	

2.	Program management documentation required per Risk-Based Acquisition Management (R-BAM) in the NASA FAR Supplement has been completed and the SMA paragraphs are current. R-BAM SMA-related documentation includes: source evaluation board membership, acquisition planning (SMA and risk management participation), risk-based contractor surveillance plan, instructions to offerors and evaluation criteria, quality assurance surveillance plan developed for the statement of work, and pre-award audit planning.	NASA FAR Supplement NPR 7120.5, Paragraph 4.5.5	
3.	Mission Assurance Surveillance Record has been developed and maintained.	NPR 8705.x, Chapter 3 NPR 8735.2 NPR 1441.1 NPR 8715.3, Paragraph 3.10	
4.	The program/project design and operations requirements are managed in a controlled and maintained manner.	NPR 8715.3, Paragraphs 1.3.4 and 3.11	
5.	The flight articles (both hardware and software) have been built to the applicable specifications and drawings. Any exceptions to the design requirements have been approved and documented.	NPR 8715.3, Paragraphs 1.3.4 and 3.11	See SSP 30695.

6.	Limited-life hardware (time, cycle) has been identified, addressed, and documented, and maintenance planning has been addressed.	NPD 8720.1	See SSP 50231.
7.	Hardware design for risk management (e.g., failure modes and effects analysis, hazard analysis) is planned and implemented. A list of safety and mission critical hardware and software items (i.e., critical items, mission hazards) has been identified and addressed.	NPD 8720.1	See SSP 30234. See SSP 50231.
8.	All reported hardware/software problems and nonconformances have been resolved and/or accepted.	NPD 8720.1, Paragraphs 1.c and 5.c	
9.	Hardware test, verification, validation, quality assurance, quality control are planned, implemented, and documented.	NPR 7120.5	
10.	For operations outside of the control of NASA, consultations have been conducted with the NASA General Counsel, the Assistant Administrator for External Relations, and the Associate Administrator for Safety and Mission Assurance regarding whether the outside entity has adequately addressed safety provisions.	NPD 8700.2, Paragraph 5.f.4  NPR 1000.3  NPR 8715.3, Paragraph 1.12	

11.	Compliance with host range requirements for public and worker safety for operations and agreement by range safety personnel to include flight termination system (FTS) security has been demonstrated.	NPR 8705.x, Appendix B  NSTISS Policy Number 12	See KSC HB 1700.7.  If U.S. DoD Range: see EWR 127-1, Paragraph 1.4.
12.	The program/project has identified the external interfaces for safety. Applicable review processes have been completed.	NPD 8710.2, Paragraph 1.b  NPR 8705.x, Appendix B  NPR 8715.3, Paragraphs 1.3, 1.11, 3.2.5, 3.3, 3.5, and Chapter 6  EWR 127-1, Paragraph 1.4	
13.	The program/project has notified the appropriate agencies for issuance of public safety notices (i.e.; FAA for Notice to Airmen, USCG for Notice to Mariners).	NPD 1000.1 (NASA Values)  NPD 8700.2, Paragraph 5.d	See SSP 30559.  See NSTS 13830.
14.	Risks associated with any hardware, software, and services (e.g., launch services) provided to the program/project have been reviewed and mitigated or accepted by NASA.	NPD 7120.4  NPD 8700.2, Paragraph 5.f.1  NPR 7120.5  NPR 8705.x, Paragraph 4.4  NPR 8715.3, Paragraph 1.3.7	See NASA review of X-43A booster SMA program. See X-43A June 2001 mishap report conclusions and recommendations.  See DC-XA Mishap Report (Sept 1996).  See GAO Testimony (GAO-01-825T), June 20, 2001.

15.	The mission assurance analysis and assessments have been completed, and identified risks have been accepted.	NPD 8710.2, Paragraph 1.b  NPD 8720.1, Paragraph 5.c  NPR 8715.3, 1.3, 1.11, 3.2.5, 3.3, 3.5-3.8, Chapter 6  EWR 127-1, Paragraph 1.4	See SSP 30309.  See SSP 30324.
16.	The program/project has defined a safety process, and identified risks have been mitigated and/or accepted.	NPD 8710.2, Paragraph 1.h.  NPR 8715.3, Paragraphs 1.3, 1.11, 3.2.5, 3.3, 3.5-3.8, and Chapter 6	See SSP 30599.  See NSTS 13830.
17.	The program/project has defined reliability and maintainability planning and provided for its implementation.	NPD 8720.1	
18.	Aviation safety program requirements have been met.	NPR 8715.3, Chapter 7	Applicable to all airplane-like EAV's.
19.	A formal orbital debris assessment has been performed.	NPD 8710.3  NPR 8705.x, Appendix B	Applicable to all programs and projects that may generate orbital debris.
20.	All sites, facilities, personnel, and procedures are ready to safely support atmospheric and/or on-orbit operations. Flight rules and the flight test plan have been reviewed for SMA impacts and approved.	NPR 8715.3, Chapter 6	

21.	The mission support team and crew have been identified, training/certification is completed, and personnel are ready to support the atmospheric and/or on-orbit operations. Mission support team and crew procedures have been defined and adopted.	NPR 8715.3, Chapter 6	
22.	All personnel, facilities, ground support equipment, and procedures are ready to support integration activities into the launch vehicle.		
23.	Required software IV&V has been identified, planned, conducted, and documented.	NPD 8730.4	
24.	Final ground and flight software loads have been validated and verified and are acceptable.		
25.	All critical data and critical communications are protected.	NPR 2810.1 NPR 8705.x, Appendix B.6 NSTISS Policy Number 12	For FTS and other safety critical functions.
26.	An emergency preparedness and contingency plan has been developed and covers recovery from all flight test operation anomalies.	NPD 8710.2, Paragraph 5.g and Chapter 7 NPD 8621.1 NPR 8715.3, Paragraph 1.6.1	
27.	All pressure vessels being used are certified as safe.	NPD 8710.5, Paragraphs 1.a, 1.g and 1.h ANSI/AIAA S-080-1998.	See KHB 1700.7. See NSTS 1700.7. See SSP 50004. See SSP 50021.

28.	The program/project has been reviewed for radioactive materials and, if present, nuclear launch safety approval obtained.	NPR 8715.3, Chapter 5	See KHB 1700.7. See NSTS 1700.7. See SSP 50004. See SSP 50021.
29.	The program/project has included Alerts, Government-Industry Data Exchange Program Alerts, and NASA Alerts in the risk management program, and they have been closed/accepted.	NPD 8720.1, Paragraph 5.c.5	
30.	The NASA Limited Life Item System and Preferred Practices System have been used to document and investigate safety, reliability, maintainability, and quality assurance techniques.	NPD 8720.1, Paragraphs 5.a.4 and 5.c.6	
31.	All relevant NASA Safety Reporting System reports have been assessed.	NPD 8700.1	
32.	All open work items applicable to flight, from operations and SMA reviews, have either been closed or are planned for closure before flight.		
33.	Compliance with NPR 8705.x, Human Rating Procedural Requirements for Space Flight Systems, has been demonstrated.	NPR 8705.x	



34.	Program flight certification process(es) has been followed and SMA findings have been addressed. There are no open SMA issues that may preclude safe operations.	NPD 8700.2, Paragraph 5.b.2	
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